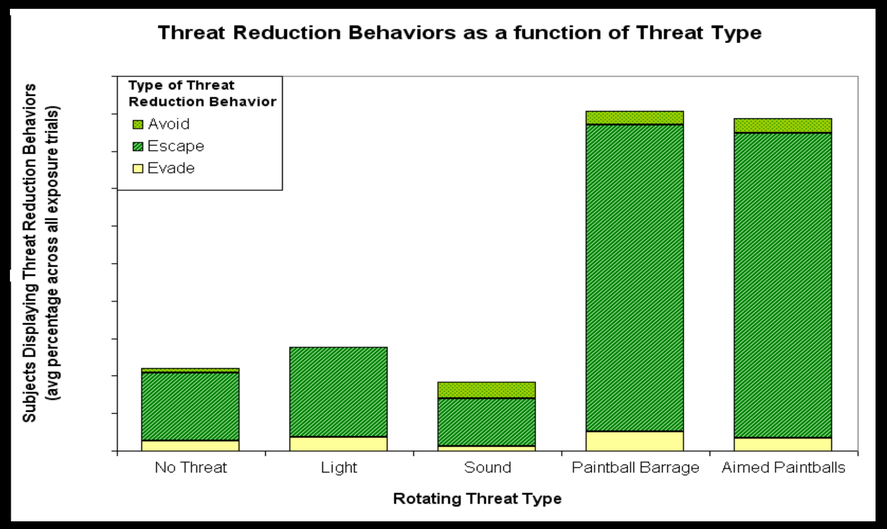
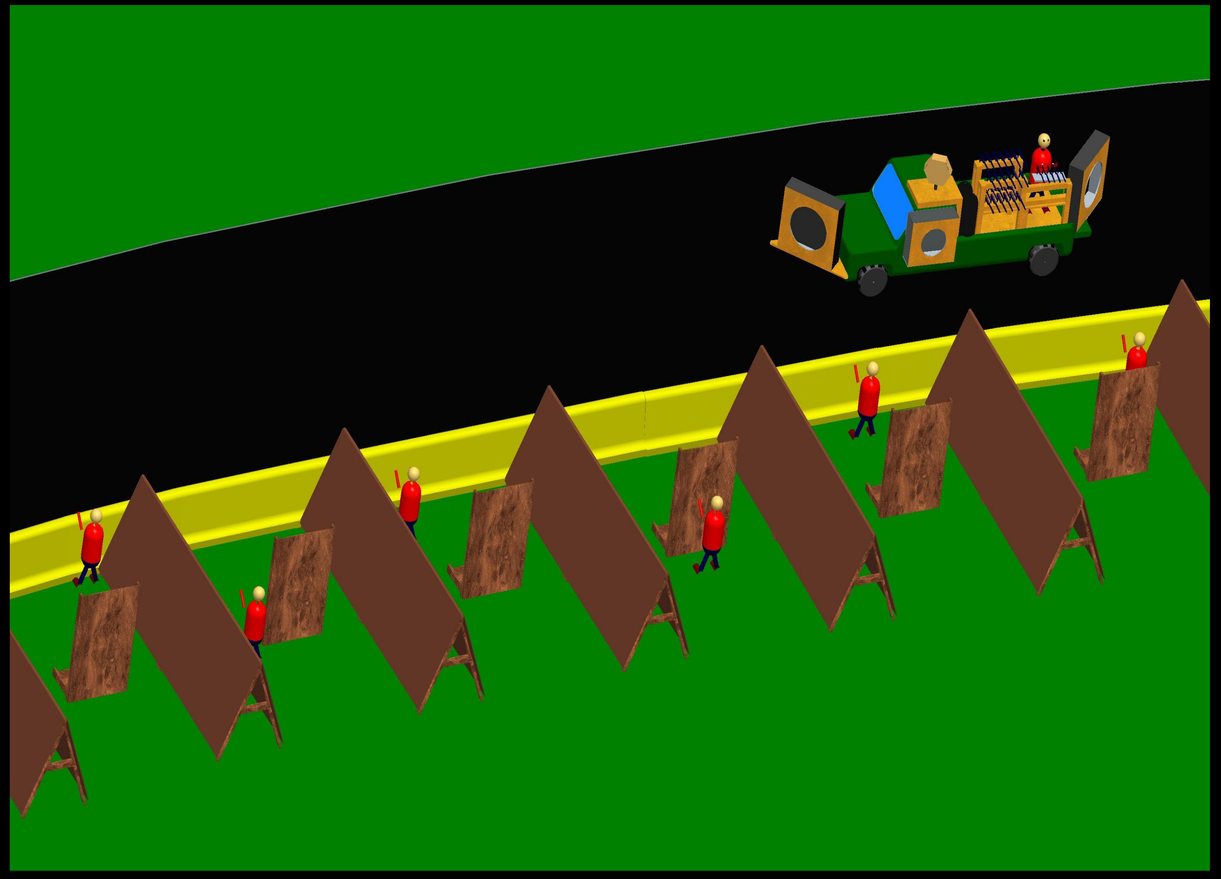
# Convoy Protection: Aggressive Acts






- Examine threat reduction behaviors (avoidance, evasion, escape) to light, sound, and blunt impact threats from rock throwers while “attacking” a passing military truck.



HSRRB # A14133 Approved

# Report Documentation Page

*Form Approved*
*OMB No. 0704-0188*



| 1. REPORT DATE | 2. REPORT TYPE | 3. DATES COVERED |
|---|---|---|
| **25 JUN 2010** | **Conference Poster Presentations** | **00-00-2008 to 00-00-2010** |

| 4. TITLE AND SUBTITLE | 5a. CONTRACT NUMBER |
|---|---|
| **Target Behavioral Response Laboratory Non-lethal Weapon Effectiveness Testing Presented at the Force Effectiveness, Analysis, and Techniques Workshop, June 25, 2010. Weehawken, New Jersey.** | 5b. GRANT NUMBER |
| | 5c. PROGRAM ELEMENT NUMBER |
| 6. AUTHOR(S) | 5d. PROJECT NUMBER |
| | 5e. TASK NUMBER |
| | 5f. WORK UNIT NUMBER |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)<br>**Army, ARDEC, Target Behavioral Response Laboratory,RDAR-EIQ-SD,Building 3518,Picatinny Arsenal,NJ,07806-5000** | 8. PERFORMING ORGANIZATION REPORT NUMBER |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) | 10. SPONSOR/MONITOR'S ACRONYM(S) |
| | 11. SPONSOR/MONITOR'S REPORT NUMBER(S) |

12. DISTRIBUTION/AVAILABILITY STATEMENT
**Approved for public release; distribution unlimited**

13. SUPPLEMENTARY NOTES
**There are 8 separate posters in this file.**

14. ABSTRACT
**Non-lethal Weapon Effectiveness Testing at the Army's Target Behavioral Response Laboratory.**

15. SUBJECT TERMS
**Non-lethal weapons, effectiveness testing, convoy protection, aggressive acts, blunt impact, tactical checkpoint, crowd, motivation, human behavior, flight characterizations hand thrown projectiles, automation of experimental design, pyrotechnics, personnel areal denial**

| 16. SECURITY CLASSIFICATION OF: | | | 17. LIMITATION OF ABSTRACT | 18. NUMBER OF PAGES | 19a. NAME OF RESPONSIBLE PERSON |
|---|---|---|---|---|---|
| a. REPORT | b. ABSTRACT | c. THIS PAGE | | | |
| **unclassified** | **unclassified** | **unclassified** | **Public Release** | **8** | |

# Blunt Impact Experiment: Self Induced Pain

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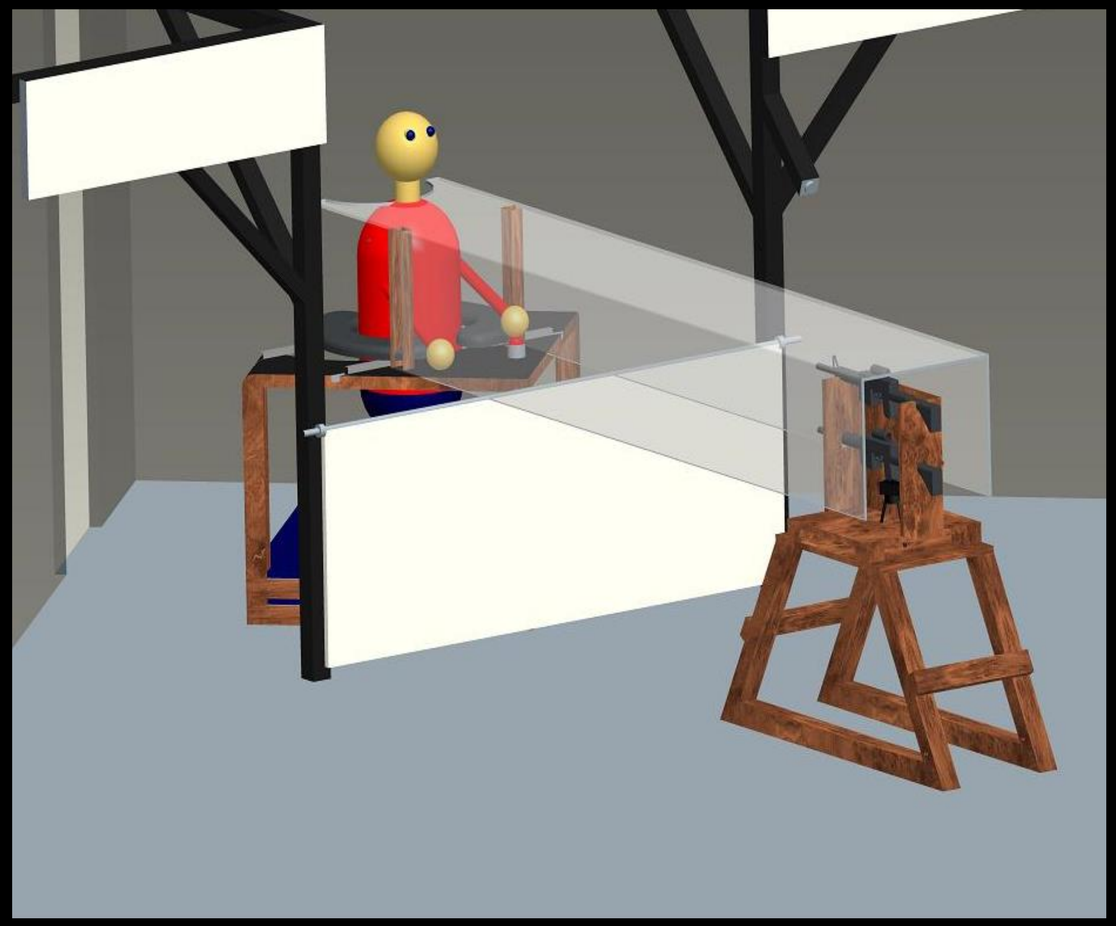
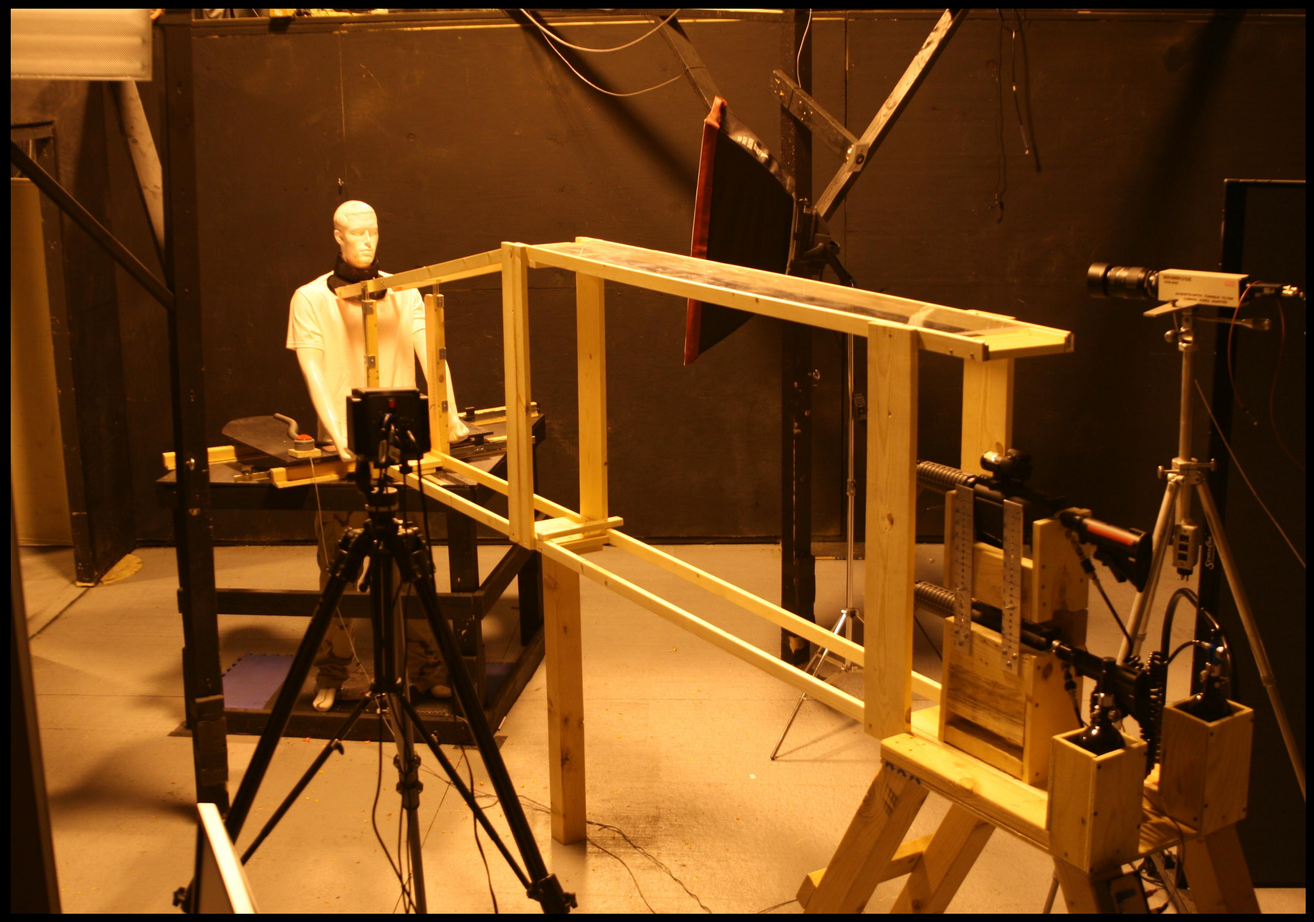
- Measure and analyze avoidance and escape behaviors to self-inflicted blunt impact.
- Examine tissue damage based on intensity and body location of hit.





ARDEC IRB # Submitted
Approval Pending

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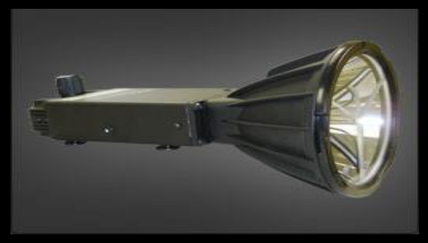
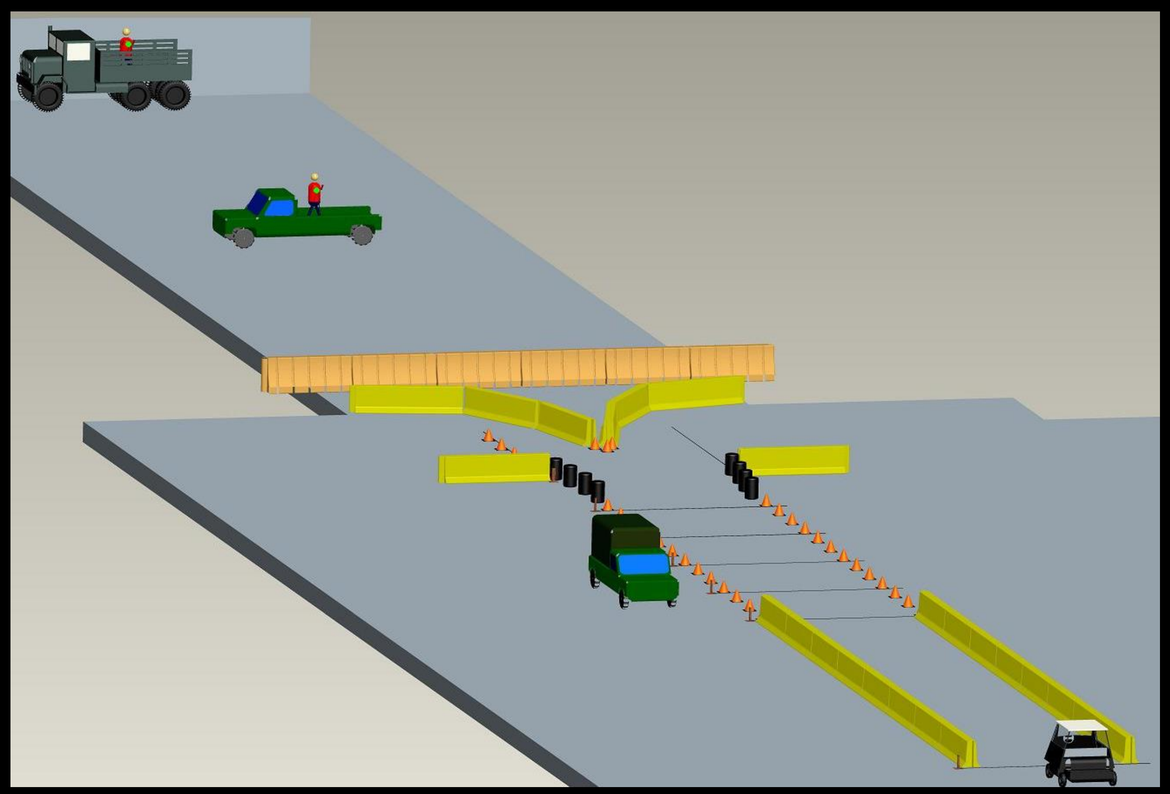
# Tactical Checkpoint: Hail/Warn/Suppress

UNCLASSIFIED

- Use standardized test bed to compare various non-lethal hail/warn/suppression technologies to baseline items (ie high beams) to determine effectiveness in a tactical checkpoint scenario.





ARDEC IRB # 100801

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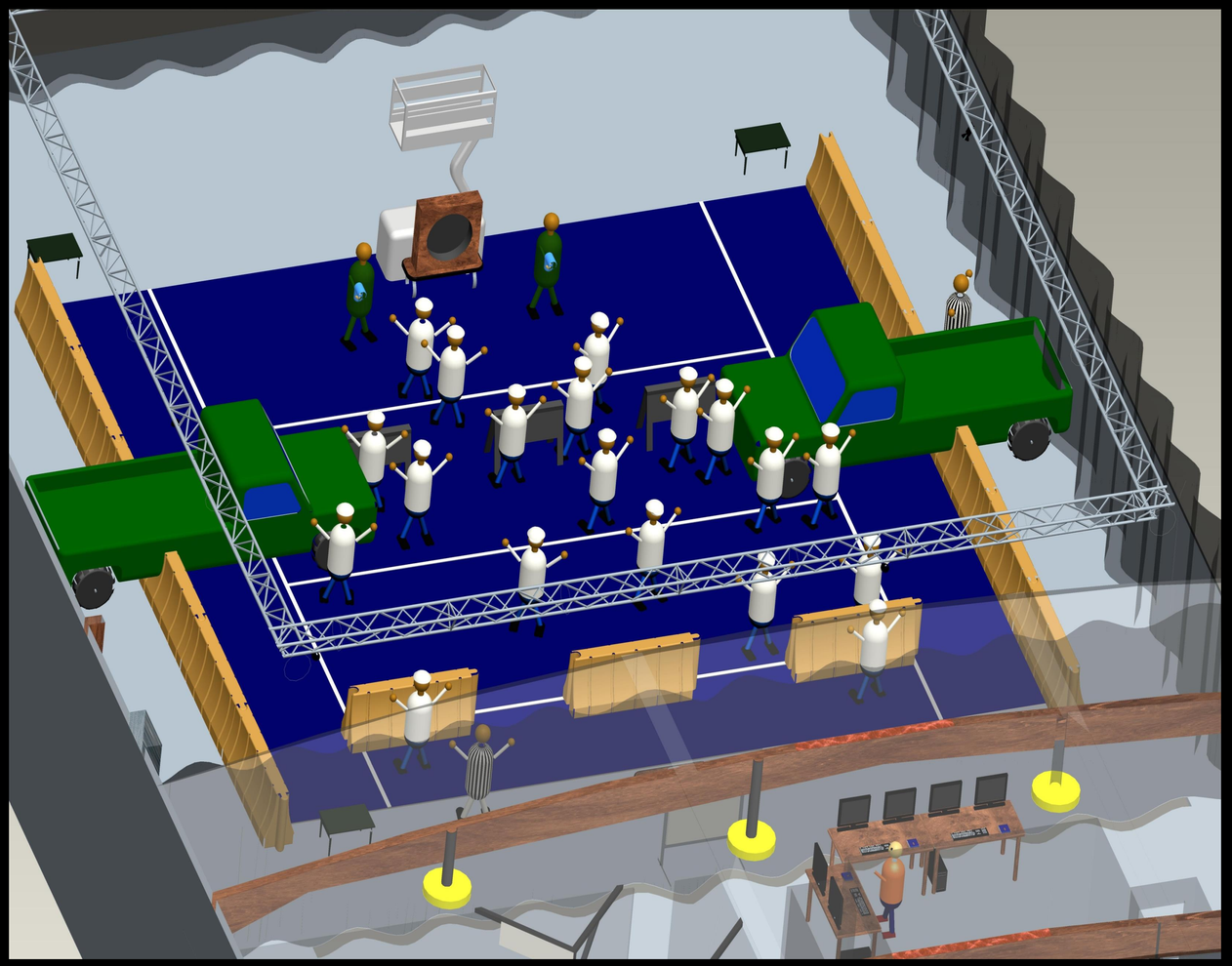
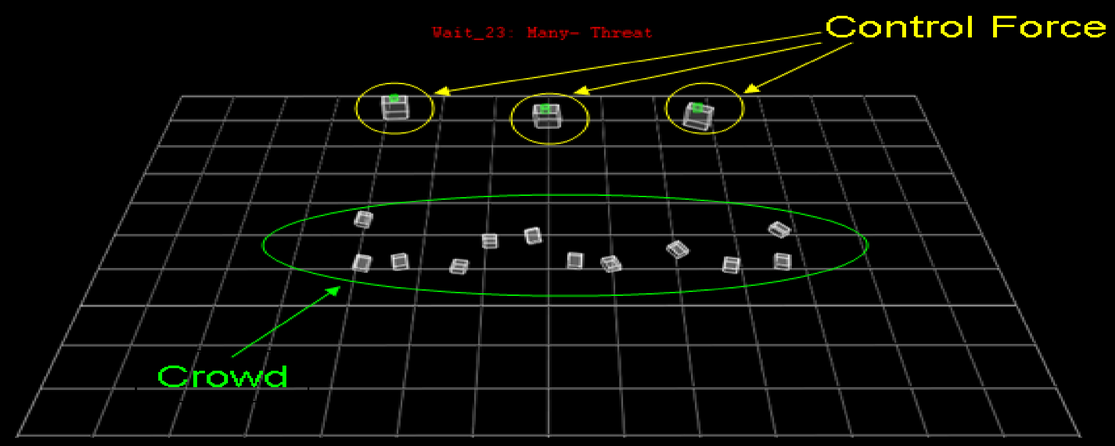
# Crowd Studies: Motivation & Behavioral Manipulations

UNCLASSIFIED

- Examine threat reduction behaviors of crowds to both blunt impact and monetary penalties via motion capture system.



- Study and analyze effects of assigned motivated personalities on crowd dynamic.




ARDEC IRB # Submitted

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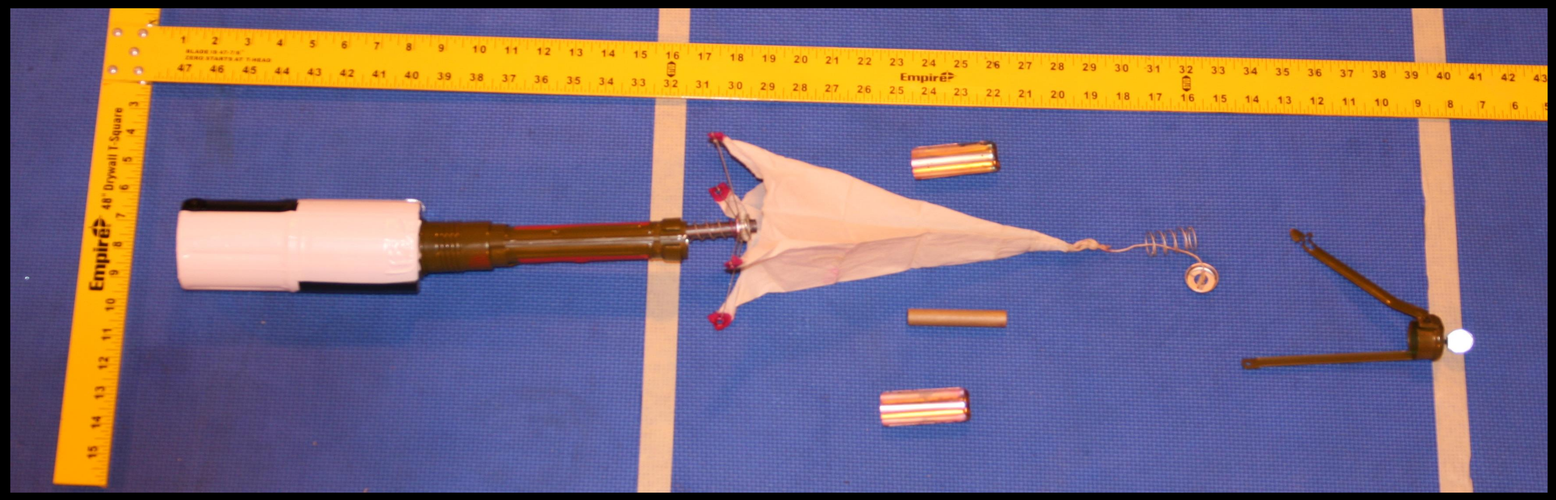
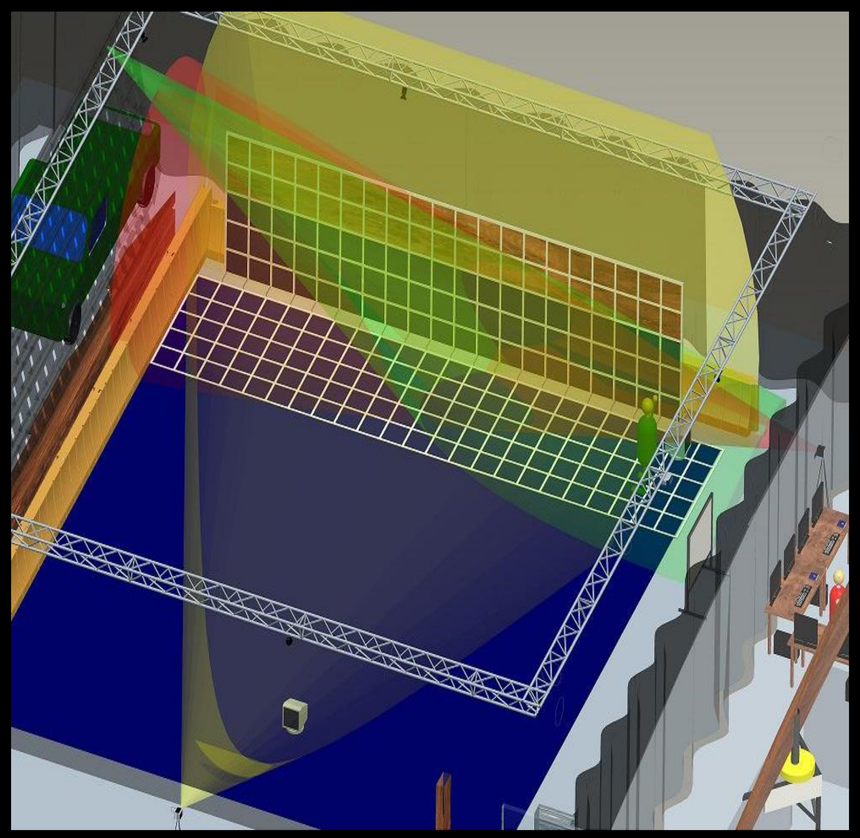
# Flight Characterization: Hand thrown projectiles - RKG

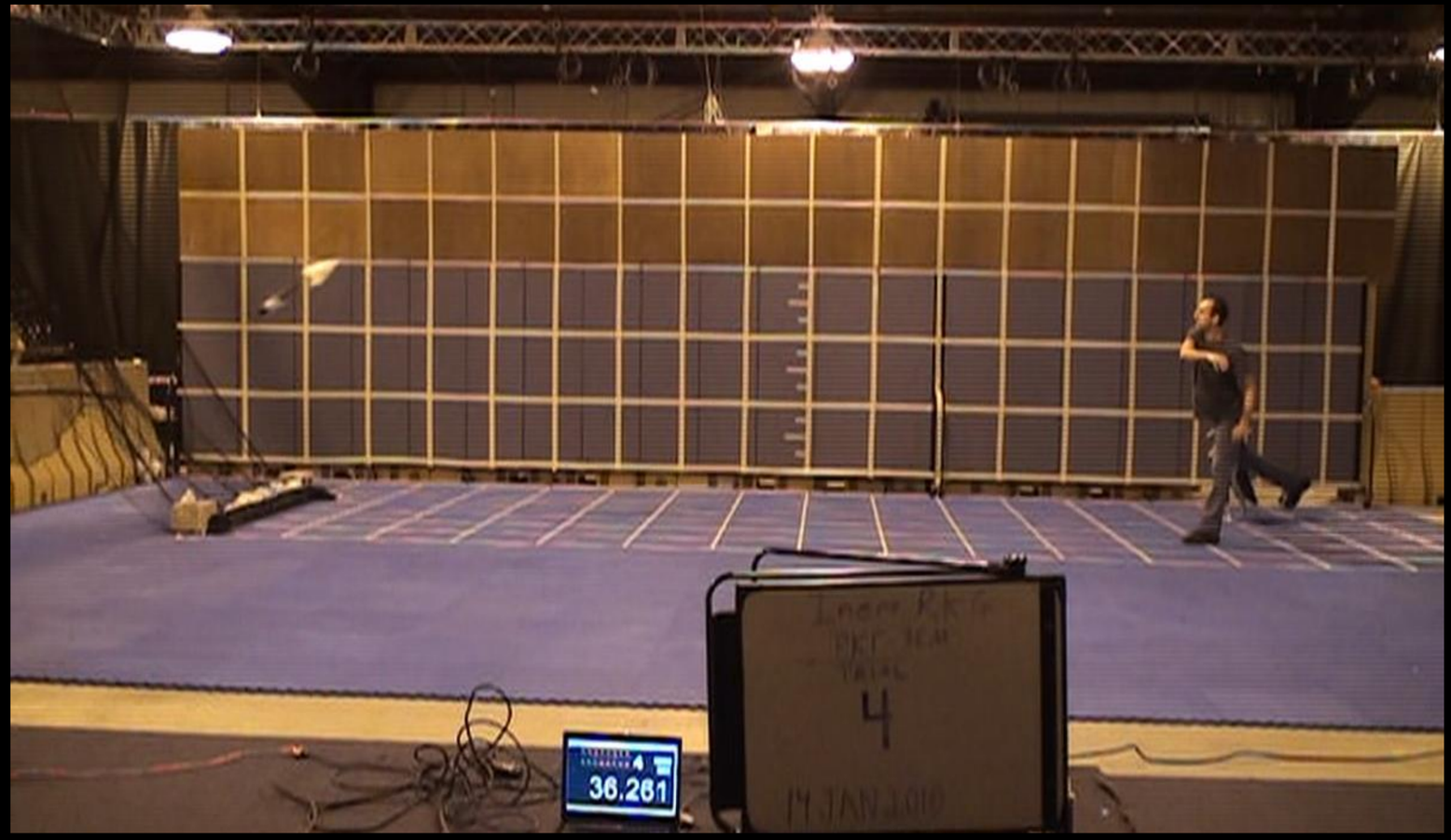
UNCLASSIFIED

- Real-time motion capture of 6DOF via VICON software/hardware system

- Multi-view camera setup coupled with (2x2ft) 3D grid allows for high res analysis.



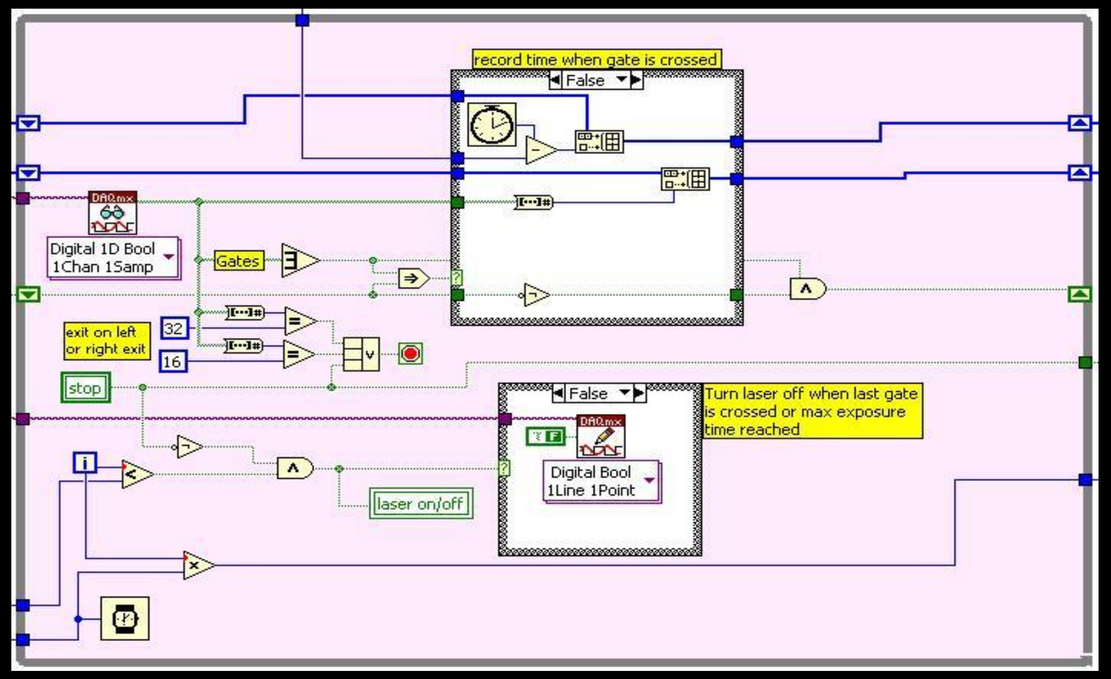



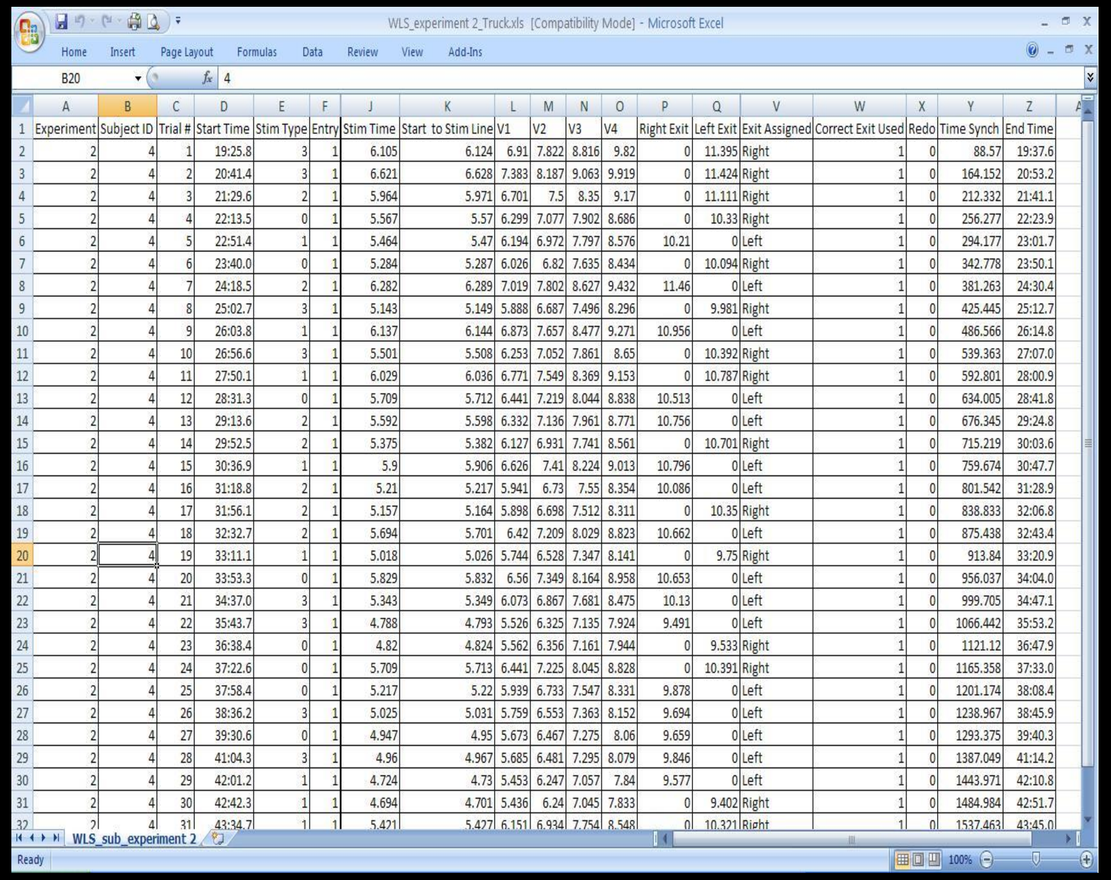


# Automation of Experimental Design-
## Tactical Checkpoint

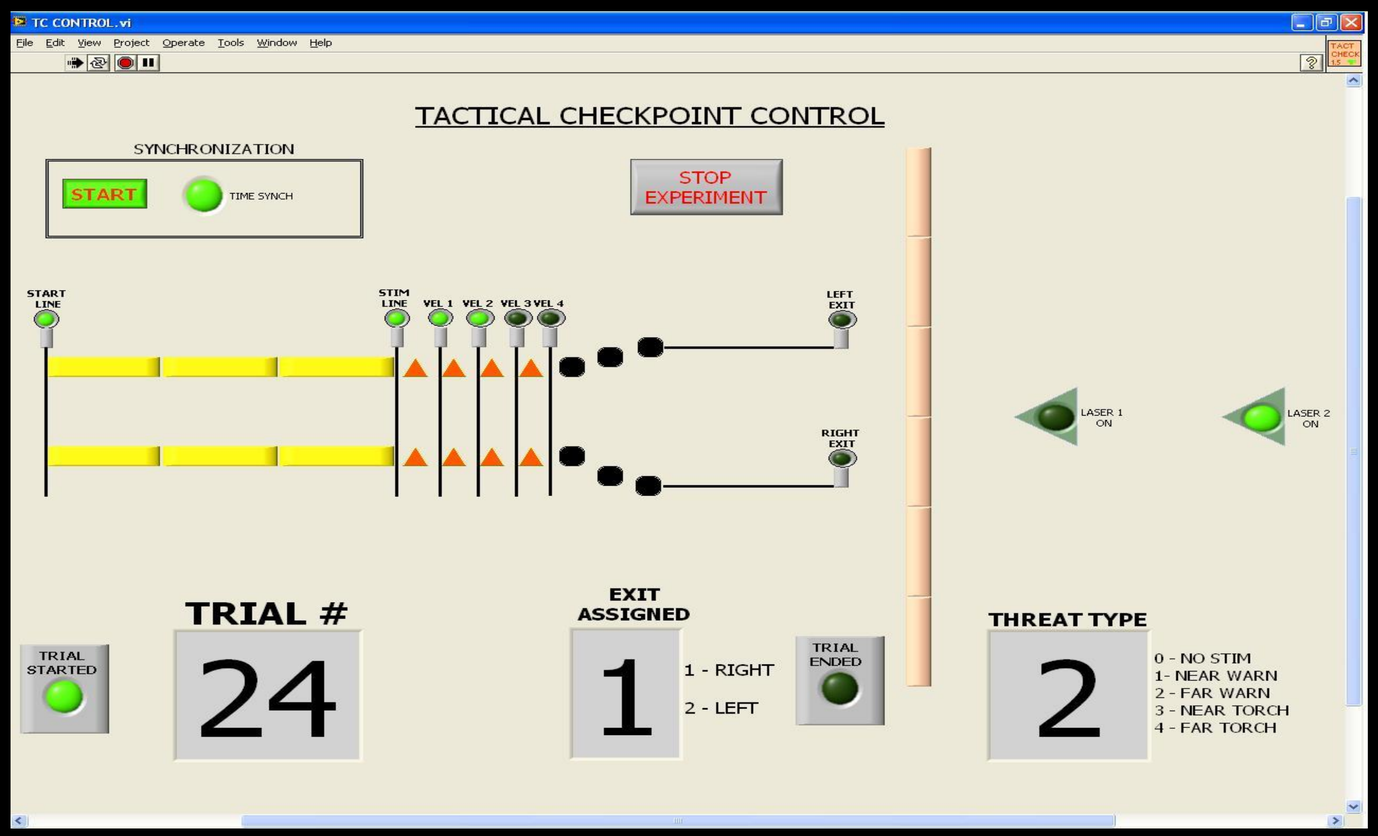
UNCLASSIFIED

- Labview Software is used to develop customized algorithm and interfaces to control experiments and data collection at the TBRL.
- Record speed, position, response to stimuli, and timing of a participant in a Tactical Checkpoint scenario
- Real time data stream to spreadsheet files as participant navigates course.
- Customized electronics to facilitate automation of experiments




| Experiment | Subject ID | Trial # | Start Time | Stim Type | Entry | Stim Time | Start to Stim Line | V1 | V2 | V3 | V4 | Right Exit | Left Exit | Exit Assigned | Correct Exit Used | Redo | Time Synch | End Time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 4 | 1 | 19:25.8 | 3 | 1 | 6.105 | 6.124 | 6.91 | 7.822 | 8.816 | 9.82 | 0 | 11.395 | Right | 1 | 0 | 88.57 | 19:37.6 |
| 2 | 4 | 2 | 20:41.4 | 3 | 1 | 6.621 | 6.628 | 7.383 | 8.187 | 9.063 | 9.919 | 0 | 11.424 | Right | 1 | 0 | 164.152 | 20:53.2 |
| 2 | 4 | 3 | 21:29.6 | 2 | 1 | 5.964 | 5.971 | 6.701 | 7.5 | 8.35 | 9.17 | 0 | 11.111 | Right | 1 | 0 | 212.332 | 21:41.1 |
| 2 | 4 | 4 | 22:13.5 | 0 | 1 | 5.567 | 5.57 | 6.299 | 7.077 | 7.902 | 8.686 | 0 | 10.33 | Right | 1 | 0 | 256.277 | 22:23.9 |
| 2 | 4 | 5 | 22:51.4 | 1 | 1 | 5.464 | 5.47 | 6.194 | 6.972 | 7.797 | 8.576 | 10.21 | 0 | Left | 1 | 0 | 294.177 | 23:01.7 |
| 2 | 4 | 6 | 23:40.0 | 0 | 1 | 5.284 | 5.287 | 6.026 | 6.82 | 7.635 | 8.434 | 0 | 10.094 | Right | 1 | 0 | 342.778 | 23:50.1 |
| 2 | 4 | 7 | 24:18.5 | 2 | 1 | 6.282 | 6.289 | 7.019 | 7.802 | 8.627 | 9.432 | 11.46 | 0 | Left | 1 | 0 | 381.263 | 24:30.4 |
| 2 | 4 | 8 | 25:02.7 | 3 | 1 | 5.143 | 5.149 | 5.888 | 6.687 | 7.496 | 8.296 | 0 | 9.981 | Right | 1 | 0 | 425.445 | 25:12.7 |
| 2 | 4 | 9 | 26:03.8 | 1 | 1 | 6.137 | 6.144 | 6.873 | 7.657 | 8.477 | 9.271 | 10.956 | 0 | Left | 1 | 0 | 486.566 | 26:14.8 |
| 2 | 4 | 10 | 26:56.6 | 3 | 1 | 5.501 | 5.508 | 6.253 | 7.052 | 7.861 | 8.65 | 0 | 10.392 | Right | 1 | 0 | 539.363 | 27:07.0 |
| 2 | 4 | 11 | 27:50.1 | 1 | 1 | 6.029 | 6.036 | 6.771 | 7.549 | 8.369 | 9.153 | 0 | 10.787 | Right | 1 | 0 | 592.801 | 28:00.9 |
| 2 | 4 | 12 | 28:31.3 | 0 | 1 | 5.709 | 5.712 | 6.441 | 7.219 | 8.044 | 8.838 | 10.513 | 0 | Left | 1 | 0 | 634.005 | 28:41.8 |
| 2 | 4 | 13 | 29:13.6 | 2 | 1 | 5.592 | 5.598 | 6.332 | 7.136 | 7.961 | 8.771 | 10.756 | 0 | Left | 1 | 0 | 676.345 | 29:24.8 |
| 2 | 4 | 14 | 29:52.5 | 2 | 1 | 5.375 | 5.382 | 6.127 | 6.931 | 7.741 | 8.561 | 0 | 10.701 | Right | 1 | 0 | 715.219 | 30:03.6 |
| 2 | 4 | 15 | 30:36.9 | 1 | 1 | 5.9 | 5.906 | 6.626 | 7.41 | 8.224 | 9.013 | 10.796 | 0 | Left | 1 | 0 | 759.674 | 30:47.7 |
| 2 | 4 | 16 | 31:18.8 | 2 | 1 | 5.21 | 5.217 | 5.941 | 6.73 | 7.55 | 8.354 | 10.086 | 0 | Left | 1 | 0 | 801.542 | 31:28.9 |
| 2 | 4 | 17 | 31:56.1 | 2 | 1 | 5.157 | 5.164 | 5.898 | 6.698 | 7.512 | 8.311 | 0 | 10.35 | Right | 1 | 0 | 838.833 | 32:06.8 |
| 2 | 4 | 18 | 32:32.7 | 2 | 1 | 5.694 | 5.701 | 6.42 | 7.209 | 8.029 | 8.823 | 10.662 | 0 | Left | 1 | 0 | 875.438 | 32:43.4 |
| 2 | 4 | 19 | 33:11.1 | 1 | 1 | 5.018 | 5.026 | 5.744 | 6.528 | 7.347 | 8.141 | 0 | 9.75 | Right | 1 | 0 | 913.84 | 33:20.9 |
| 2 | 4 | 20 | 33:53.3 | 0 | 1 | 5.829 | 5.832 | 6.56 | 7.349 | 8.164 | 8.958 | 10.653 | 0 | Left | 1 | 0 | 956.037 | 34:04.0 |
| 2 | 4 | 21 | 34:37.0 | 3 | 1 | 5.343 | 5.349 | 6.073 | 6.867 | 7.681 | 8.475 | 10.13 | 0 | Left | 1 | 0 | 999.705 | 34:47.1 |
| 2 | 4 | 22 | 35:43.7 | 3 | 1 | 4.788 | 4.793 | 5.526 | 6.325 | 7.135 | 7.924 | 9.491 | 0 | Left | 1 | 0 | 1066.442 | 35:53.2 |
| 2 | 4 | 23 | 36:38.4 | 0 | 1 | 4.82 | 4.824 | 5.562 | 6.356 | 7.161 | 7.944 | 0 | 9.533 | Right | 1 | 0 | 1121.12 | 36:47.9 |
| 2 | 4 | 24 | 37:22.6 | 0 | 1 | 5.709 | 5.713 | 6.441 | 7.225 | 8.045 | 8.828 | 0 | 10.391 | Right | 1 | 0 | 1165.358 | 37:33.0 |
| 2 | 4 | 25 | 37:58.4 | 0 | 1 | 5.217 | 5.22 | 5.939 | 6.733 | 7.547 | 8.331 | 9.878 | 0 | Left | 1 | 0 | 1201.174 | 38:08.4 |
| 2 | 4 | 26 | 38:36.2 | 3 | 1 | 5.025 | 5.031 | 5.759 | 6.553 | 7.363 | 8.152 | 9.694 | 0 | Left | 1 | 0 | 1238.967 | 38:45.9 |
| 2 | 4 | 27 | 39:30.6 | 0 | 1 | 4.947 | 4.95 | 5.673 | 6.467 | 7.275 | 8.06 | 9.659 | 0 | Left | 1 | 0 | 1293.375 | 39:40.3 |
| 2 | 4 | 28 | 41:04.3 | 3 | 1 | 4.96 | 4.967 | 5.685 | 6.481 | 7.295 | 8.079 | 9.846 | 0 | Left | 1 | 0 | 1387.049 | 41:14.2 |
| 2 | 4 | 29 | 42:01.2 | 1 | 1 | 4.724 | 4.73 | 5.453 | 6.247 | 7.057 | 7.84 | 9.577 | 0 | Left | 1 | 0 | 1443.971 | 42:10.8 |
| 2 | 4 | 30 | 42:42.3 | 1 | 1 | 4.694 | 4.701 | 5.436 | 6.24 | 7.045 | 7.833 | 0 | 9.402 | Right | 1 | 0 | 1484.984 | 42:51.7 |
| 2 | 4 | 31 | 43:34.7 | 1 | 1 | 5.421 | 5.427 | 6.151 | 6.934 | 7.754 | 8.548 | 0 | 10.321 | Right | 1 | 0 | 1537.463 | 43:45.0 |

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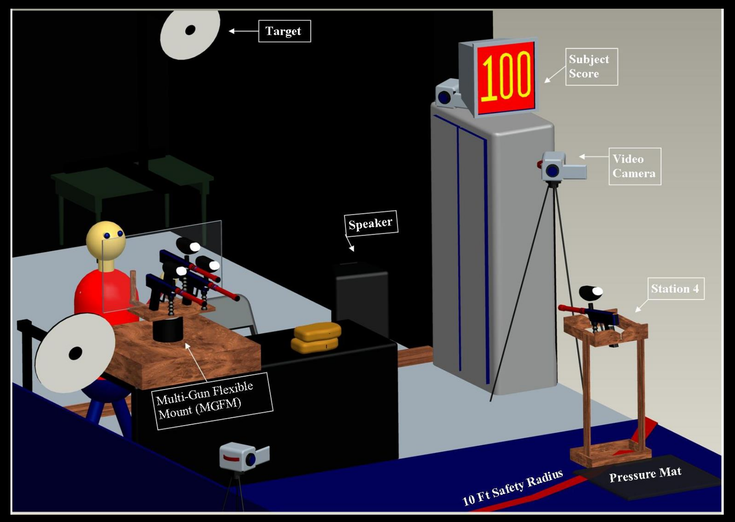
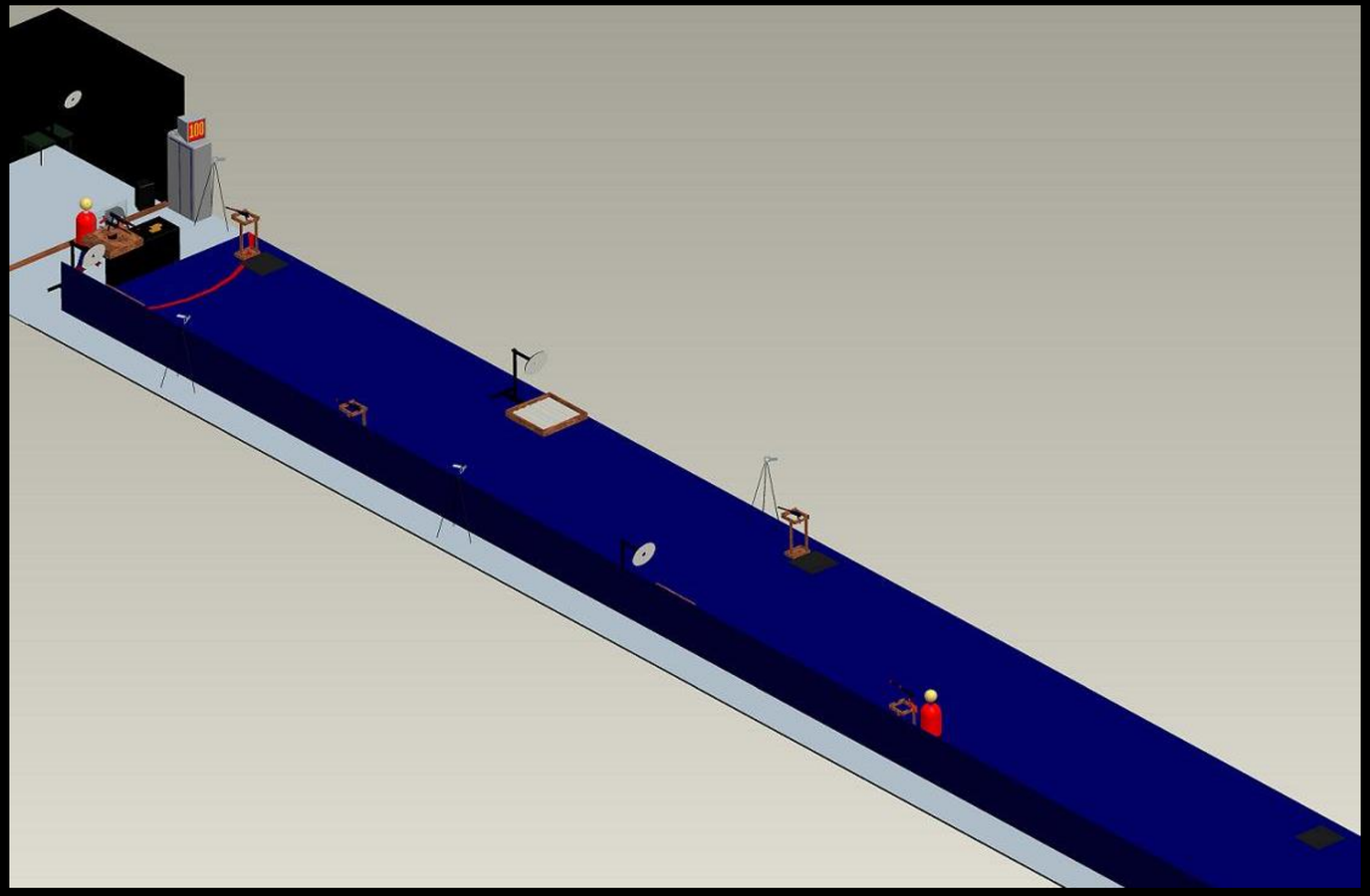
# Blunt Impact: Minimal Intrinsic Motivation






- Determine baseline for suppressing approach by use of blunt impact under low intrinsic motivation conditions.



# Personnel Area Denial: Pyrotechnics

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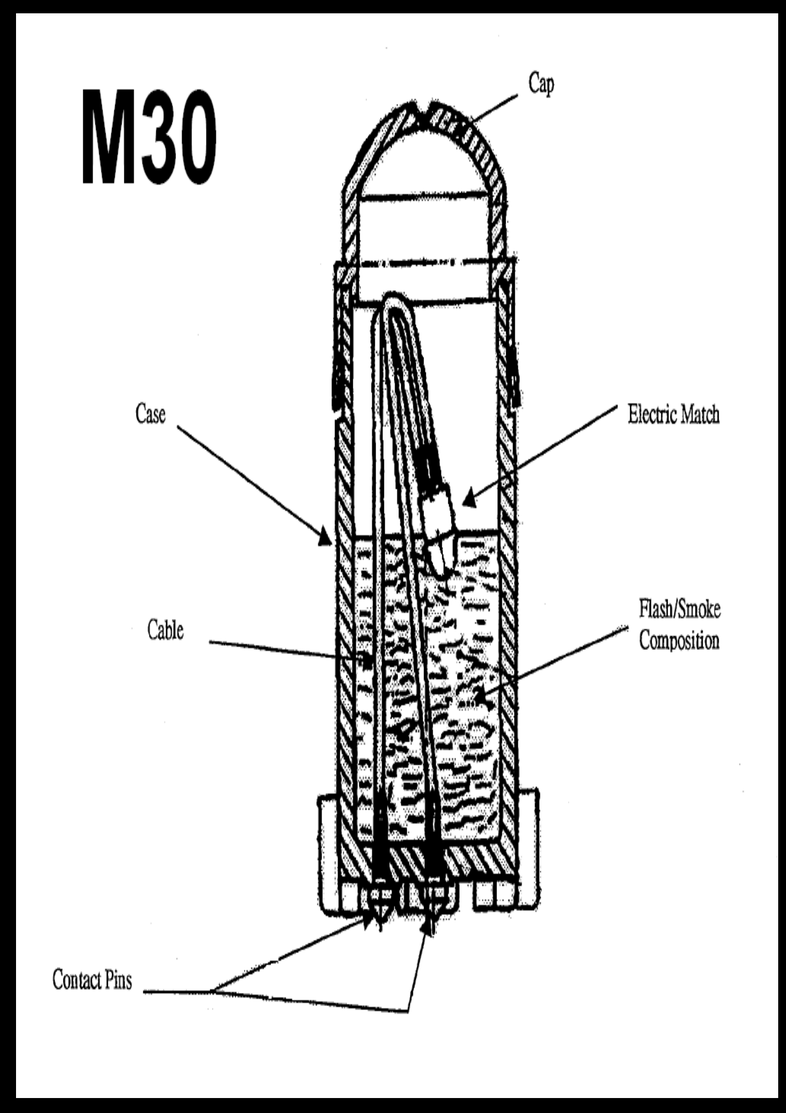
- Joint project with Intelligent Munitions Systems (IMS) to study effectiveness of pyrotechnic devices in deterring unsuspecting individuals.

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